Amendment and Response Under 37 C.F.R. 1.116
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Title: DIFFRACTIVE OPTICAL ELEMENT WITH ANTI-REFLECTION COATING

IN THE CLAIMS

Please amend claim 16 as follows:

1.(Previously Presented) A diffractive optical element, comprising:

a substrate having a surface relief pattern formed on a first side thereof; and

an anti-reflection coating formed on the surface relief pattern by a directional deposition technique, thereby forming a coated surface relief pattern with substantially the same dimensions as the surface relief pattern formed on the substrate.

2.(Original) The diffractive optical element of claim 1, wherein the substrate is a semiconductor material.

3.(Original) The diffractive optical element of claim 1, wherein the diffractive optical element is a transmission grating.

4.(Original) The diffractive optical element of claim 1, wherein the anti-reflection coating is a dielectric material.

5.(Original) The diffractive optical element of claim 4, wherein the anti-reflection coating is selected from the group consisting of silicon nitride, titanium dioxide, and silicon dioxide.

6.(Cancelled)

7.(Original) The diffractive optical element of claim 1, wherein the surface relief pattern formed on the substrate includes a first set of surfaces that are each substantially parallel to a longitudinal plane of the substrate, and a second set of surfaces that are each substantially perpendicular to the longitudinal plane, and wherein each of the surfaces in the second set includes a surface portion that is substantially free from the anti-reflection coating.

8.(Original) The diffractive optical element of claim 7, wherein each of the surfaces in the first set is substantially covered by the anti-reflection coating.

9.(Original) A method of forming a substantially anti-reflective diffractive optical element, comprising:

providing a substrate;

forming a surface relief pattern on a first side of the substrate; and

directionally depositing an anti-reflection coating on the surface relief pattern, thereby substantially maintaining dimensions of the surface relief pattern.

10.(Original) The method of claim 9, wherein the substrate is a semiconductor material.

11.(Original) The method of claim 9, wherein the anti-reflection coating is a dielectric material.

12.(Original) The method of claim 11, wherein the anti-reflection coating is selected from the group consisting of silicon nitride, titanium dioxide, and silicon dioxide.

13.(Original) The method of claim 9, wherein the anti-reflection coating is deposited by evaporation.

14.(Original) The method of claim 13, wherein the anti-reflection coating is deposited by electron beam evaporation.

15.(Original) The method of claim 9, wherein the anti-reflection coating is deposited by sputtering.

16.(Currently Amended) A diffractive optical element, comprising:

a substrate having a first side with a plurality of light diffracting features, the light diffracting features each having a width dimension parallel to a longitudinal plane of the substrate, the substrate configured to focus infrared light; and

an anti-reflection coating ~~formed~~ directionally deposited on the first side of the substrate, thereby forming a plurality of coated light diffracting features, the coated features each having a width dimension that is substantially the same as the width dimension of a corresponding one of the light diffracting features of the substrate.

17.(Original) The diffractive optical element of claim 16, wherein the substrate is a semiconductor material.

18.(Original) The diffractive optical element of claim 16, wherein the anti-reflection coating is a dielectric material.

19.(Original) The diffractive optical element of claim 16, wherein the anti-reflection coating is applied by a directional deposition technique.

20.(Original) The diffractive optical element of claim 16, wherein the plurality of light diffracting features of the substrate include a first set of surfaces that are each substantially parallel to the longitudinal plane of the substrate, and a second set of surfaces that are each substantially perpendicular to the longitudinal plane, and wherein each of the surfaces in the second set includes a surface portion that is substantially free from the anti-reflection coating.

21.(Previously Presented) The diffractive optical element of claim 16, wherein the anti-reflection coating has a thickness greater than about 170 nanometers.

22.(Previously Presented) The diffractive optical element of claim 16, wherein the substrate is configured to focus infrared light at wavelengths greater than about 700 nanometers.

23.(Previously Presented) The diffractive optical element of claim 16, wherein the anti-reflection coating comprises titanium oxide.

24.(Previously Presented) The diffractive optical element of claim 16, wherein the plurality of light diffracting features comprise a plurality of evenly-spaced grooves formed in the substrate.